Predator/Prey Ratio Analysis & Salmonid Working Group Updates

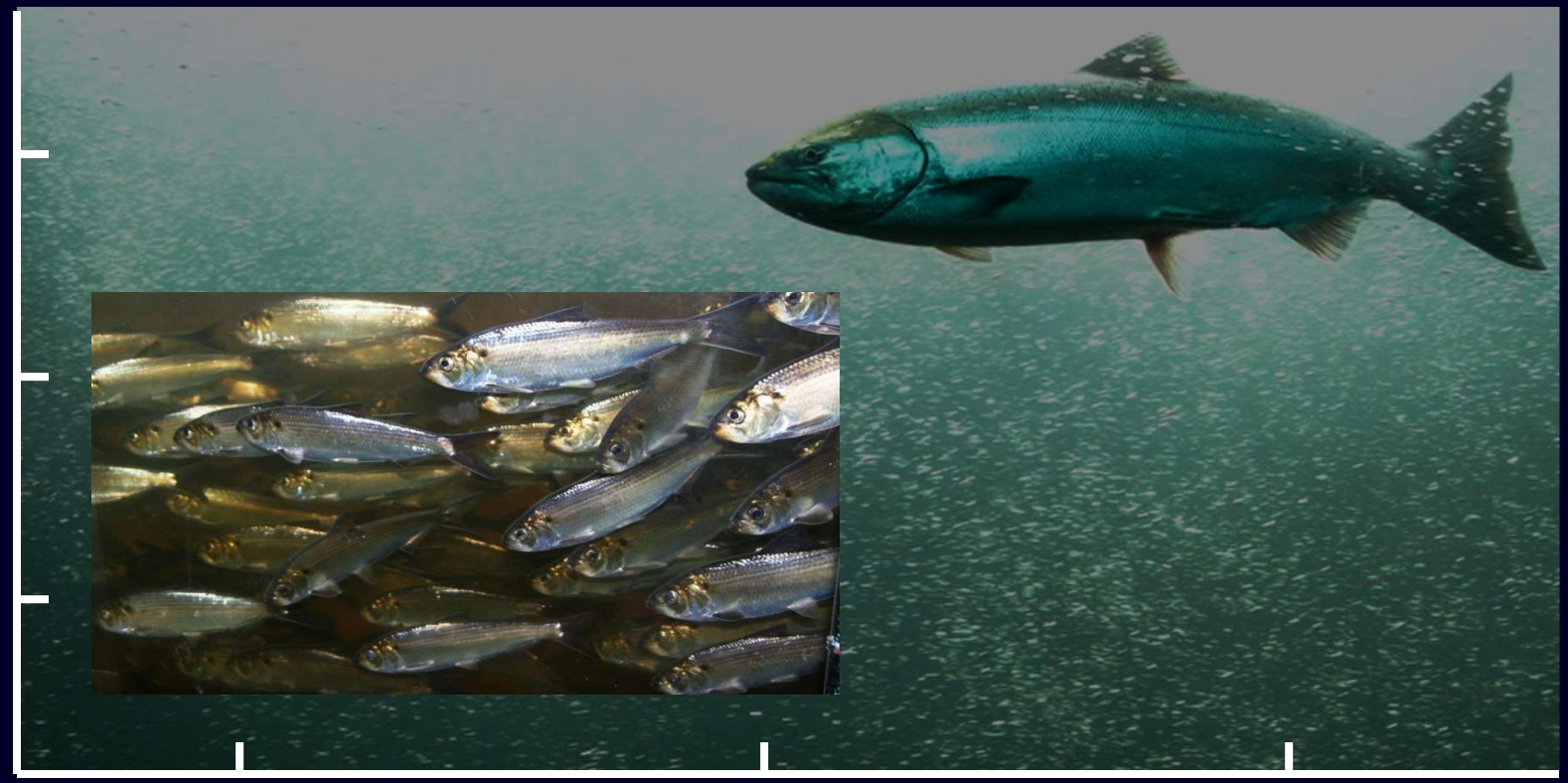
Salmonid Working Group:

- Dave Warner, Chuck Madenjian (USGS)
- Jory Jonas, Ben Turschak, Mark Tonello (MI DNR)
- Nick Legler (chair), Iyob Tsehaye (WI DNR)
- Brian Breidert, Ben Dickinson (IN DNR)
- Steve Robillard (IL DNR)
- Chuck Bronte, Matt Kornis, Rob Elliott (USFWS)
- Richard Clark (QFC, MSU)
- Barton, Nathan (GTB)
- Czesny, Sergiusz (INHS)
- Clark, Eric (Sault Tribe)

Key Collaborations:

- Great Lakes Fishery Commission
- Lake Michigan Committee
- Planktivore Working Group
- USFWS Mass Marking Program
- Several agencies & personal provided input, data, etc.
- QFC at MSU

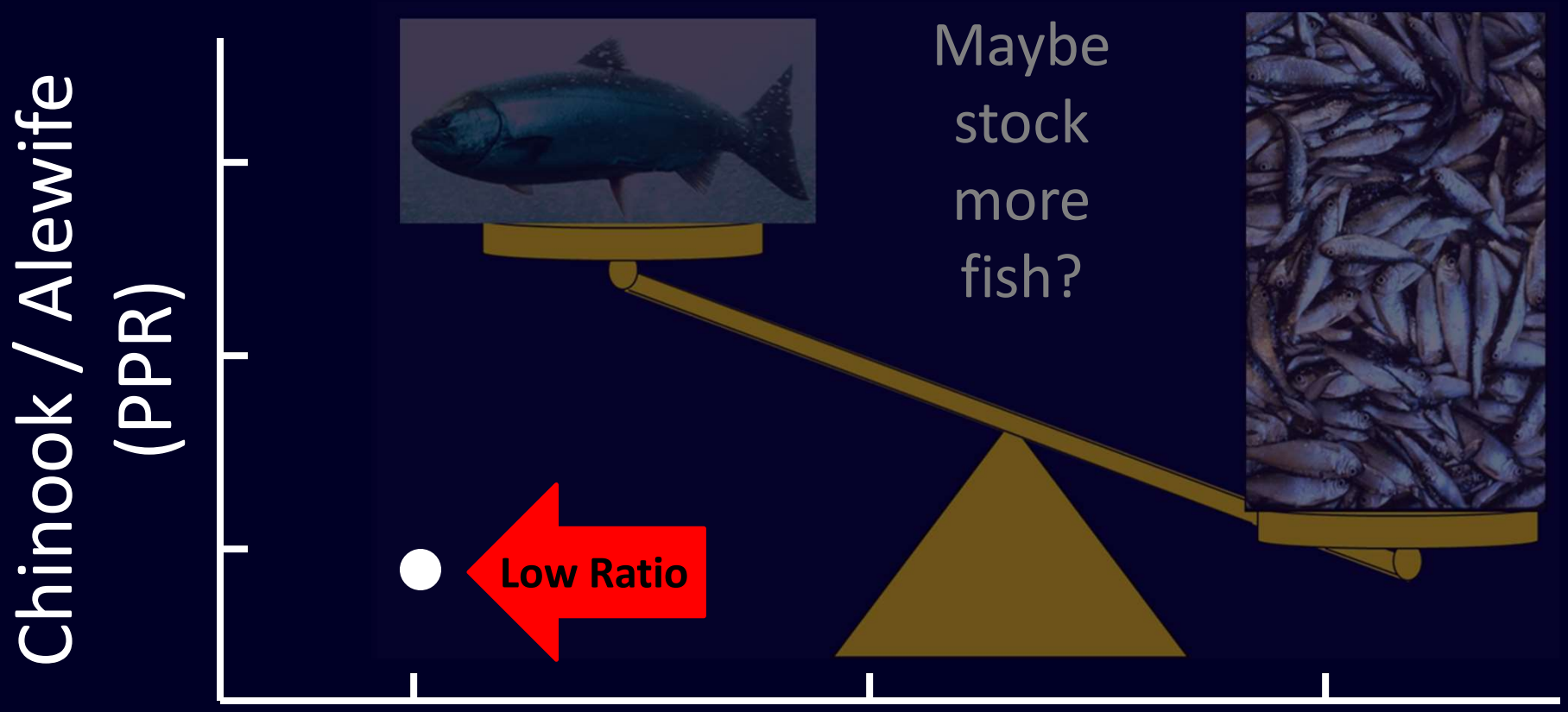
Chinook Total Lake Biomass ÷ **Alewife Total Lake Biomass** = **P/P Ratio**



Chinook / Alewife (PPR)

Year X Year Y Year Z

Chinook Total Lake Biomass ÷ **Alewife Total Lake Biomass** = **P/P Ratio**



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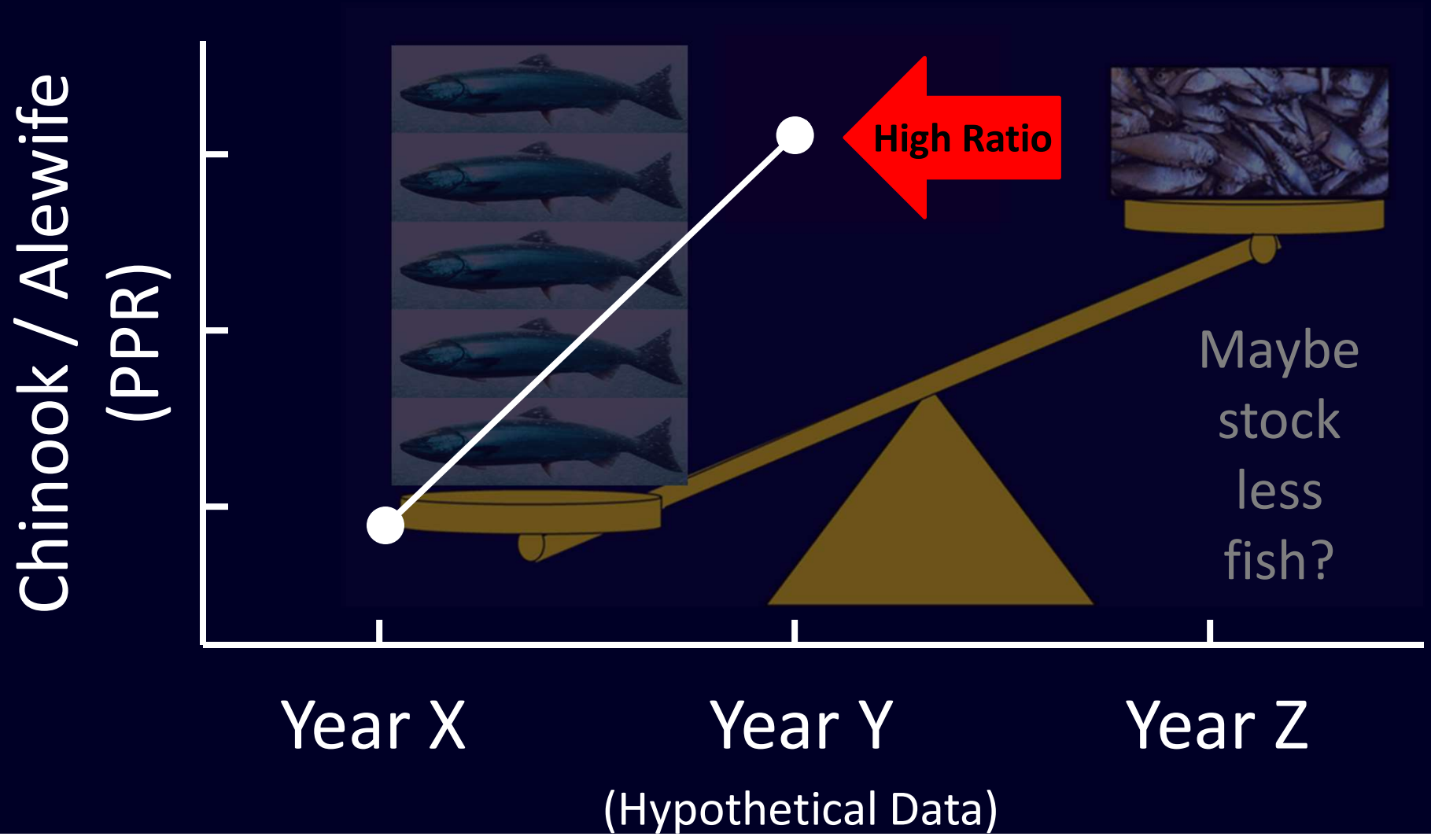

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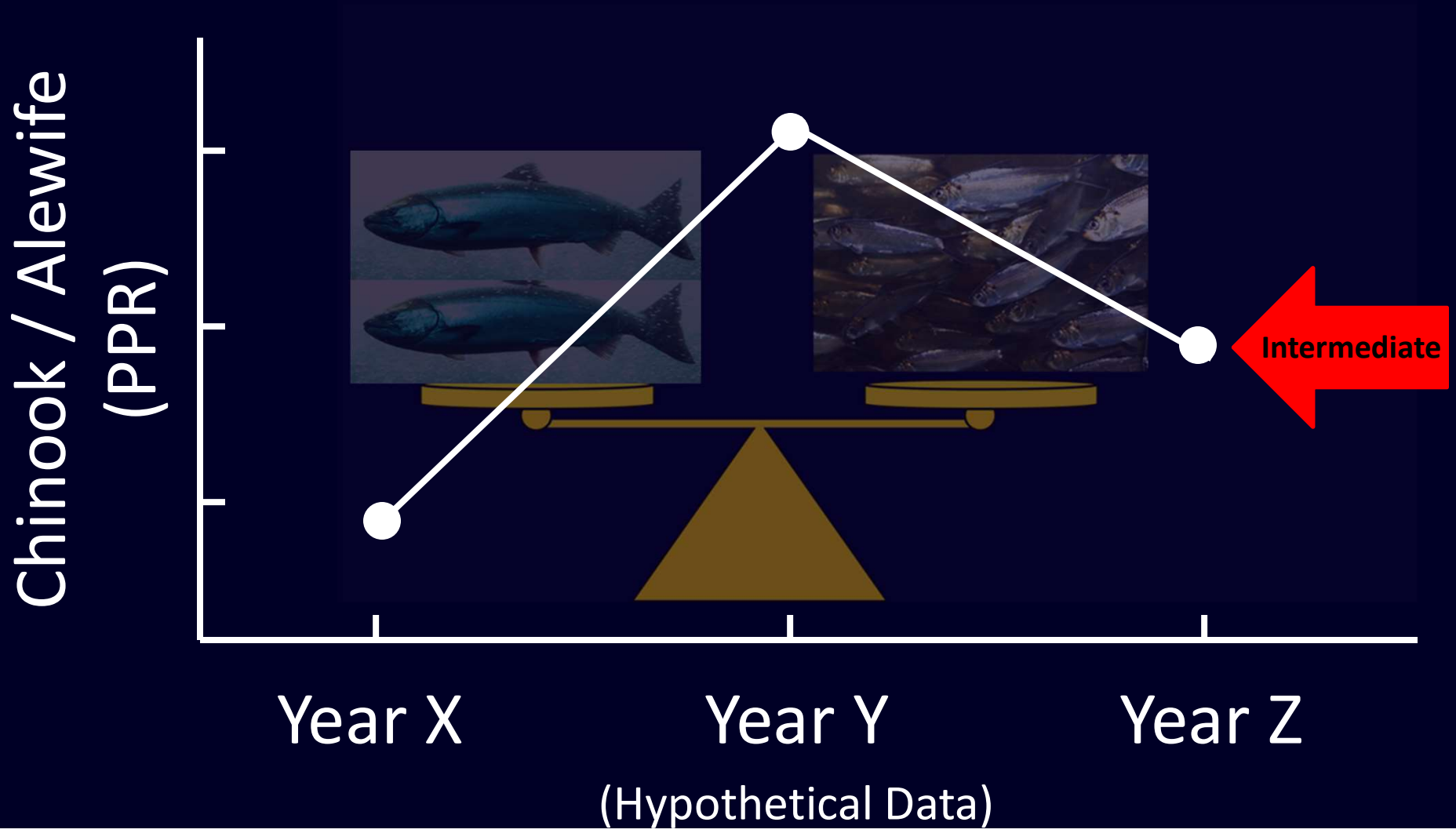
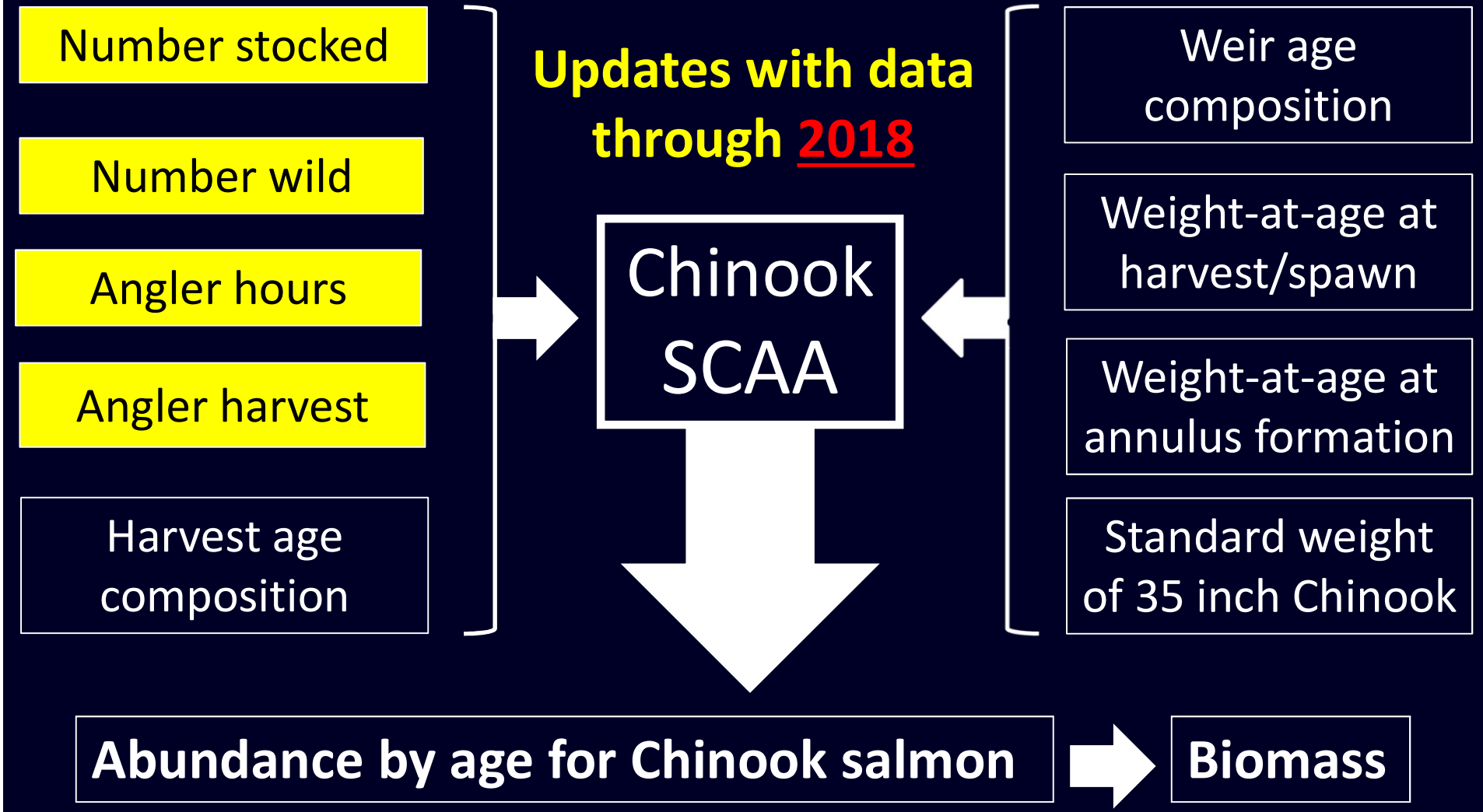
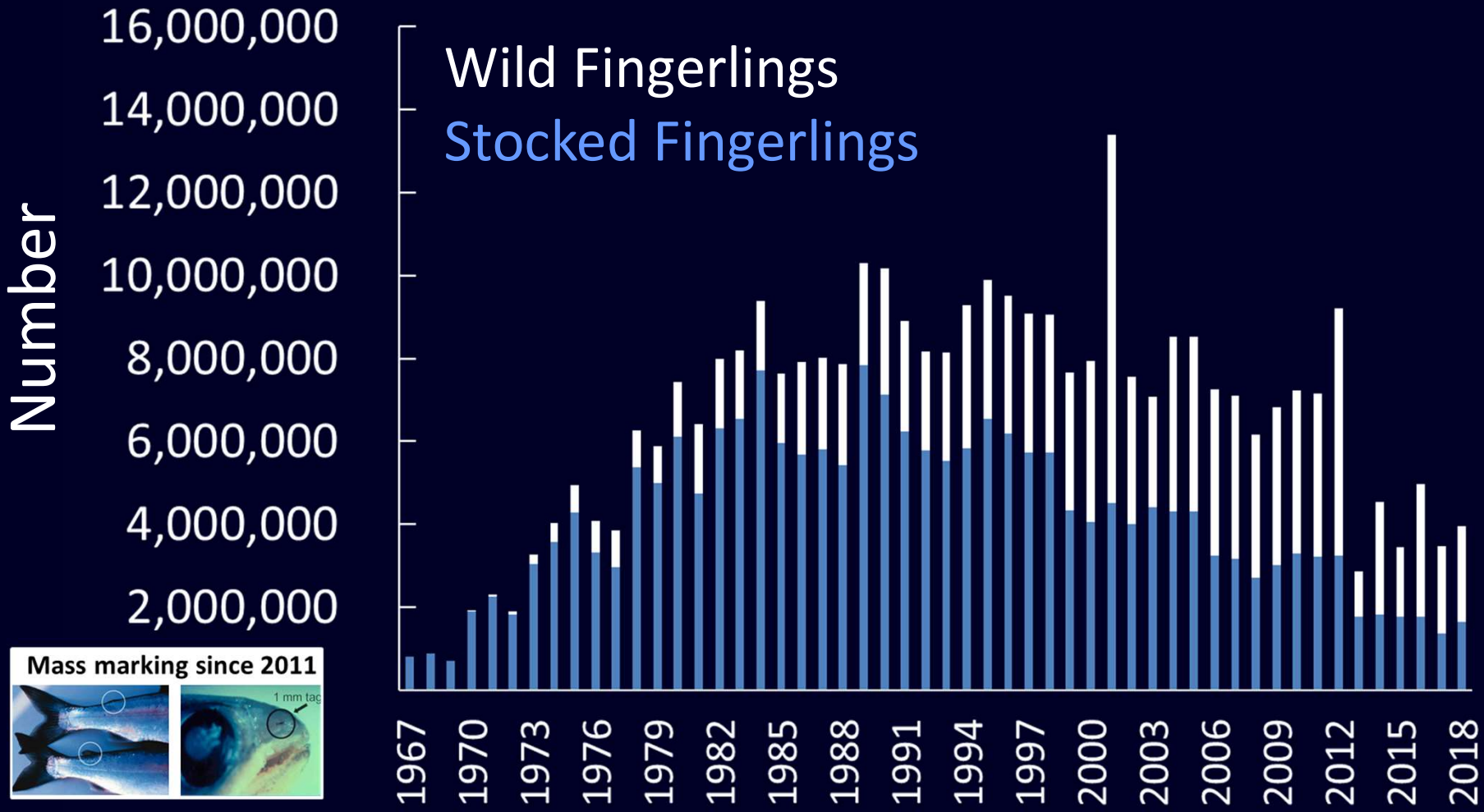


Statistical Catch at Age Model (SCAA)



Tsehaye, I., M. L. Jones, J. R. Bence, T. O. Brenden, C. P. Madenjian, and D. M. Warner. 2014. A multispecies statistical age-structured model to assess predator–prey balance: application to an intensively managed Lake Michigan pelagic fish community. Canadian Journal of Fisheries and Aquatic Sciences 71:1-18.

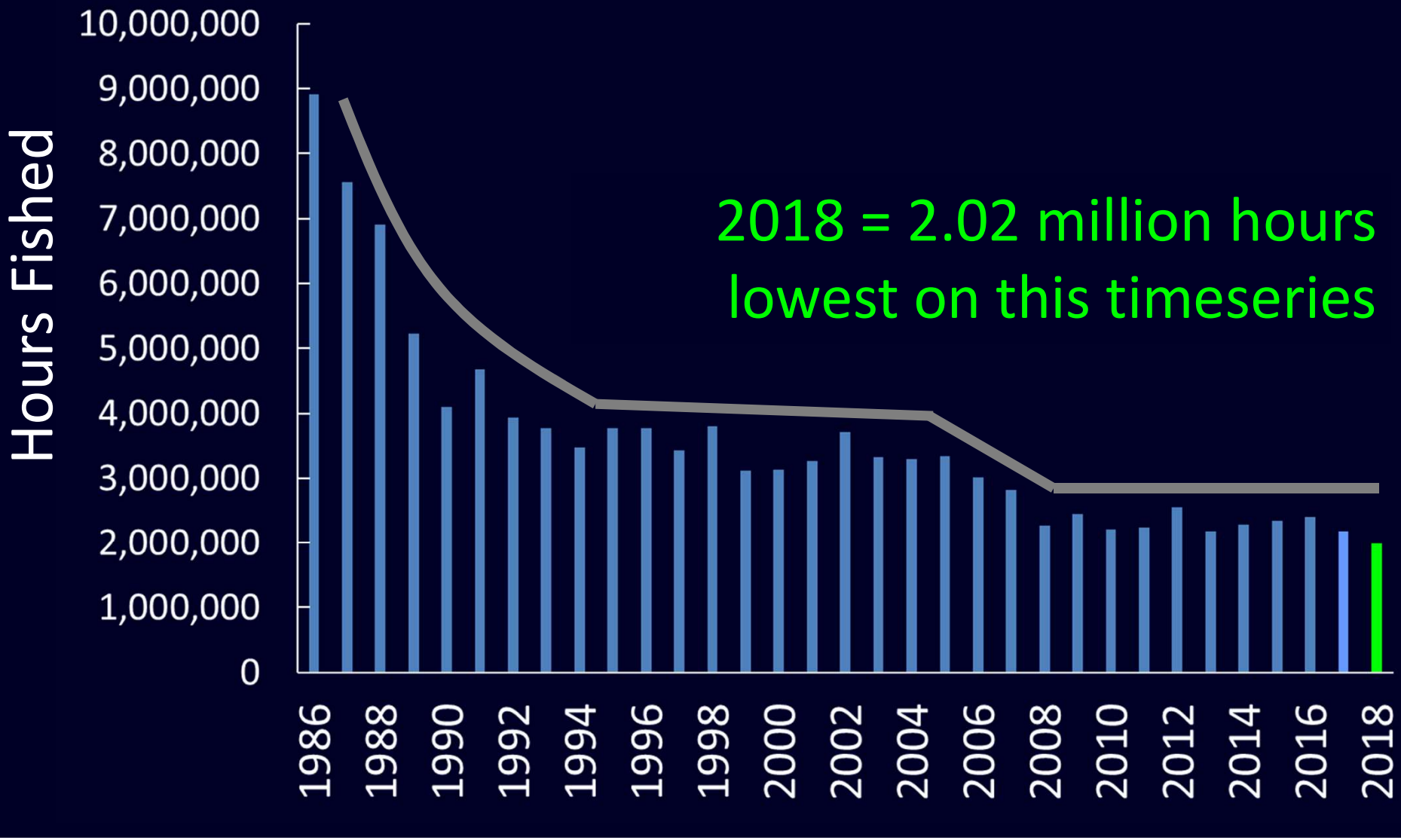
Number of Chinook Fingerlings in Lake Michigan (stocked & wild; 1967-2018)



Recent estimates of % wild at age 1 have consistently been around 50% (e.g., high 2013 = 64.8%; low 2014 = 38.6%; 2018 = 60.4%).

Targeted Angler Effort for Salmon/Trout

Lake MI (boat only; charter & non-charter; all states)



Targeted Angler Effort for Salmon/Trout

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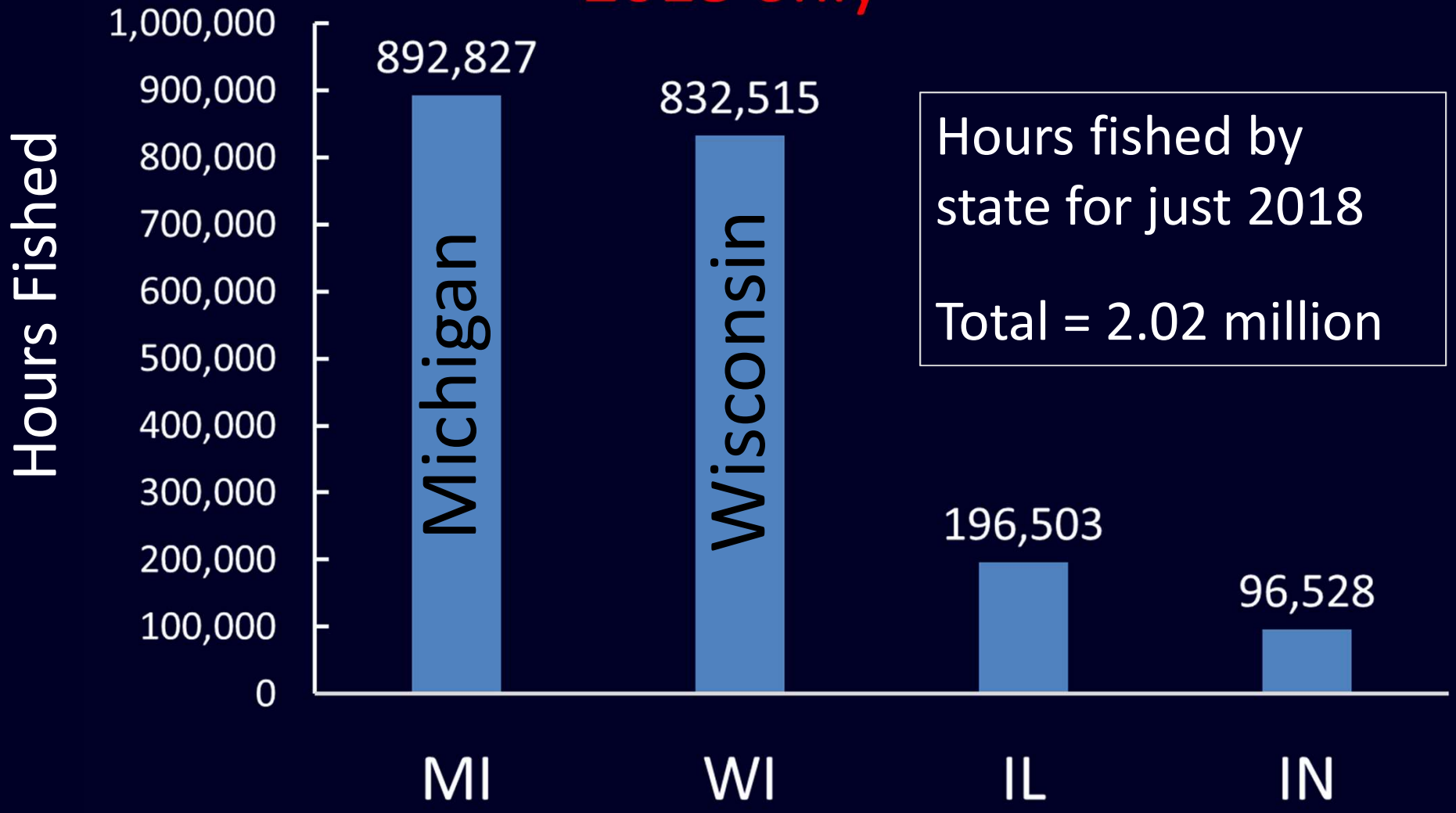
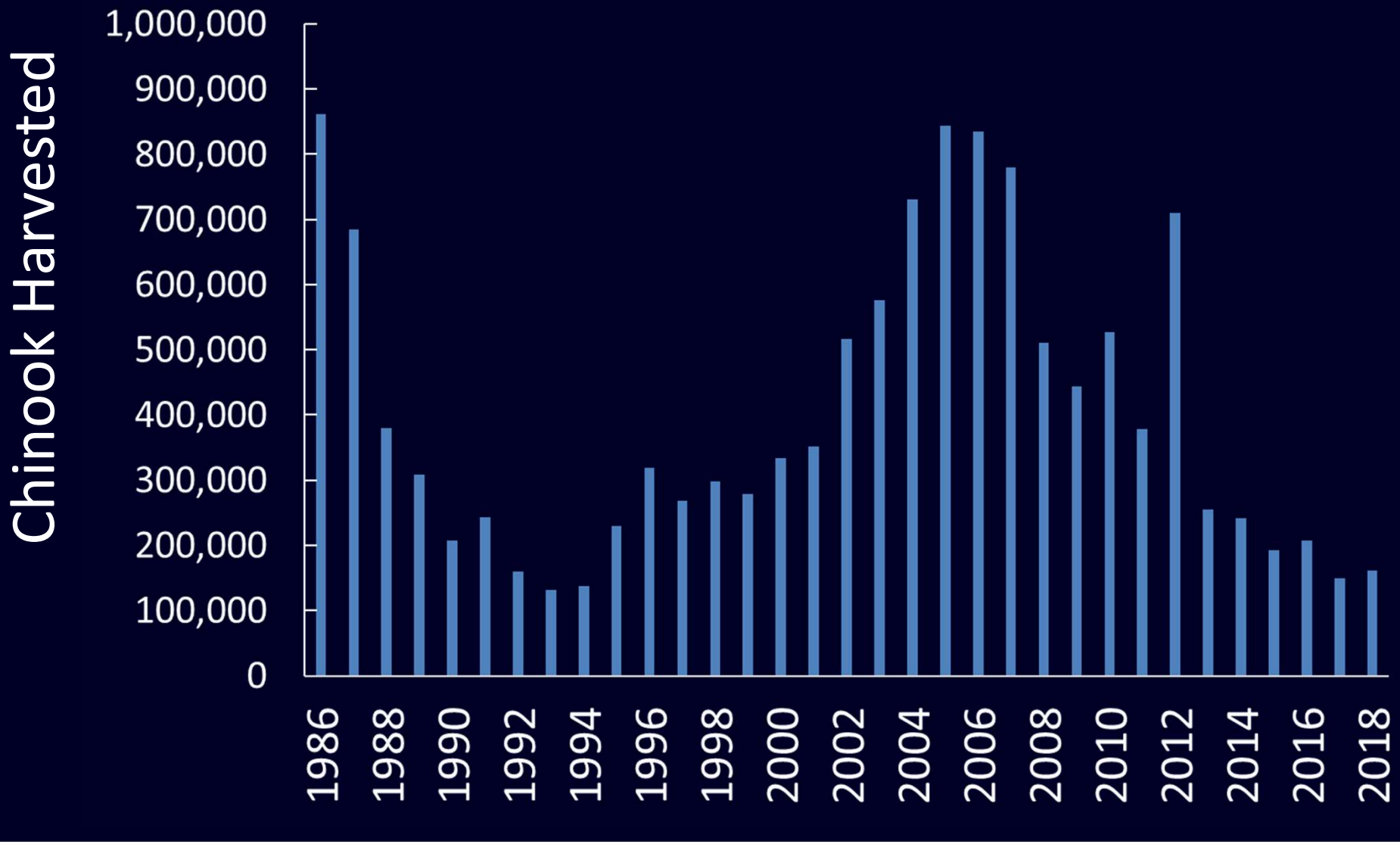
2018 only



Numbers of Chinook Harvested

Lake MI (all types of fishing except stream; all states)



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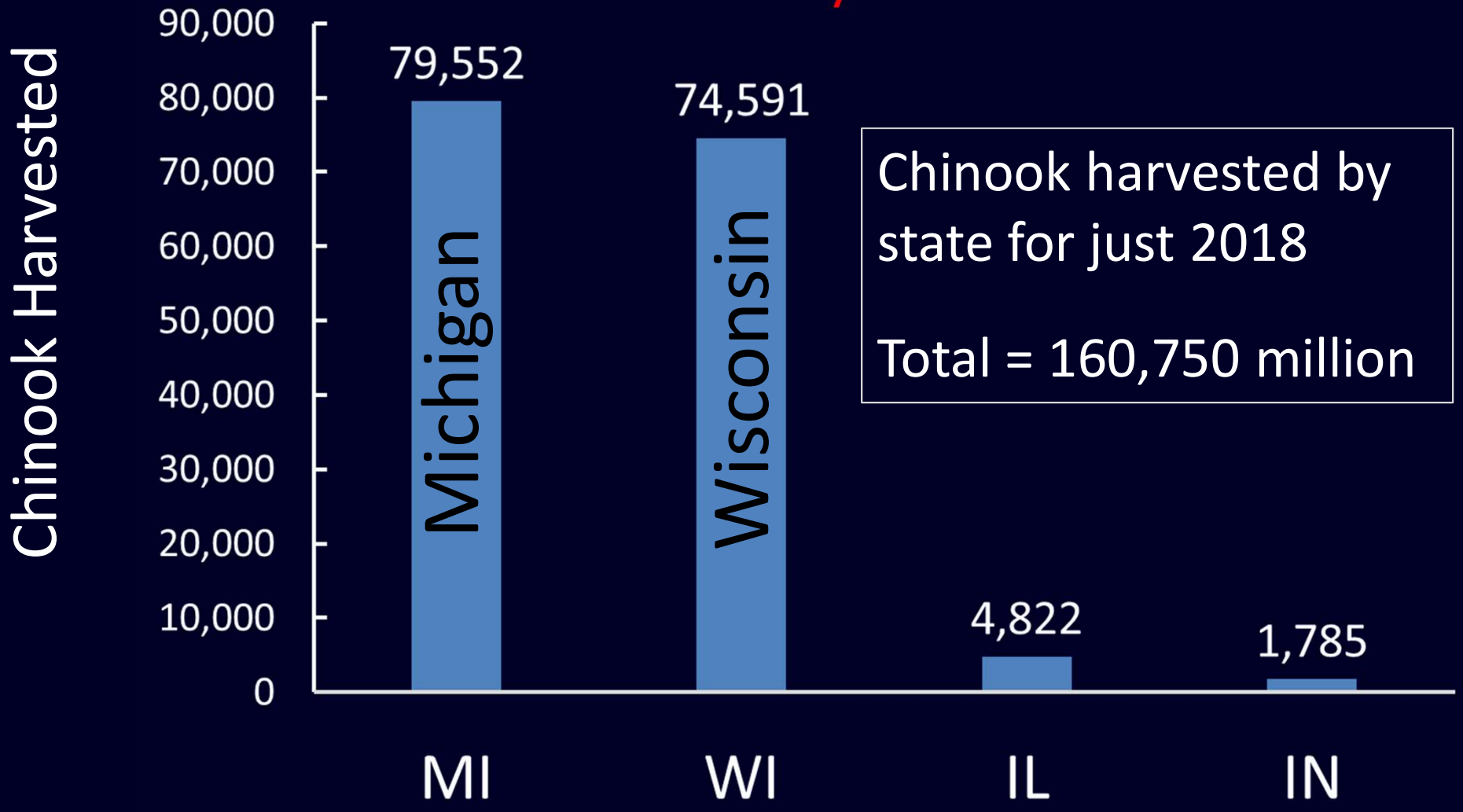
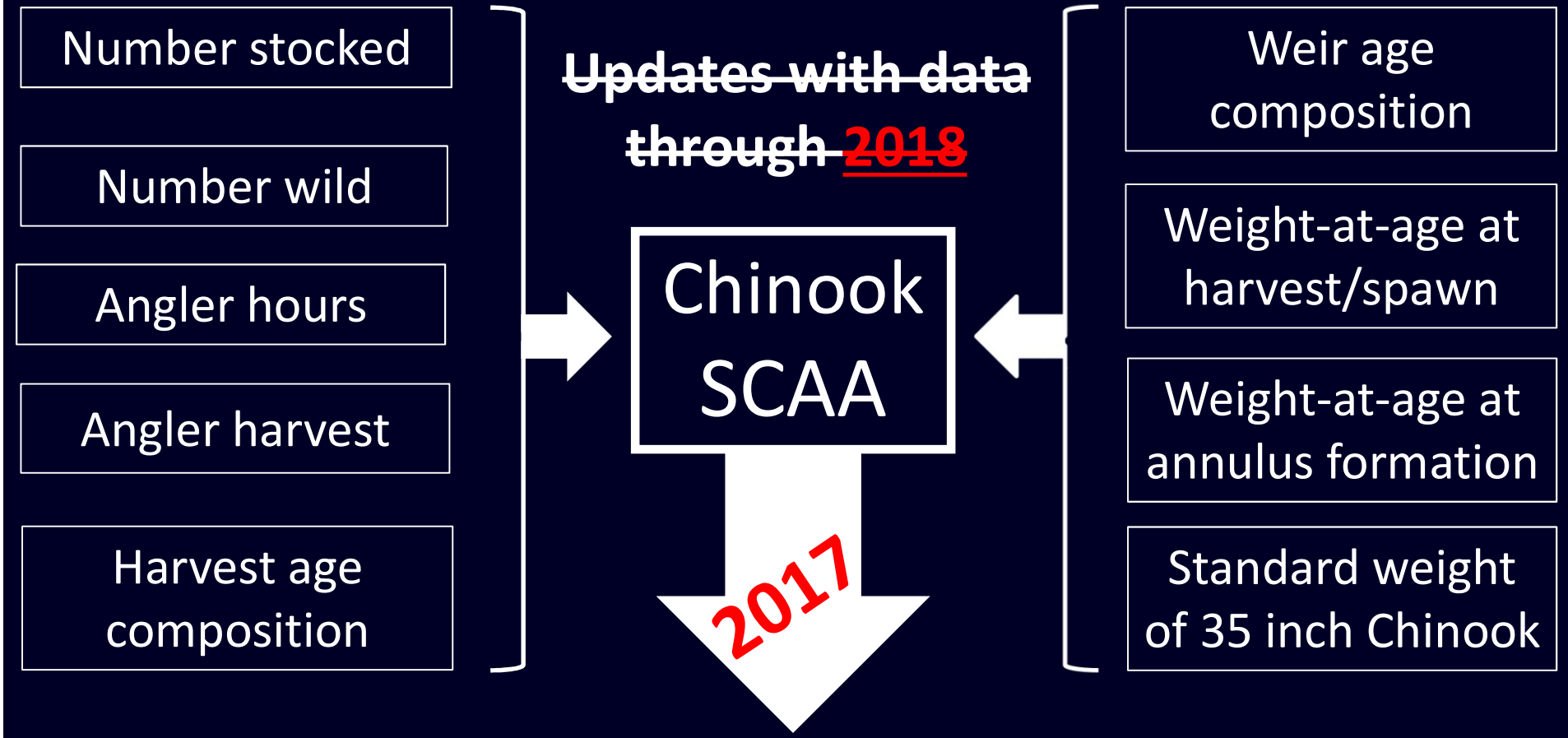


Chinook harvested by state for just 2018

Total = 160,750 million

Statistical Catch at Age Model (SCAA)



Abundance by age for Chinook salmon → **Biomass**

Tsehaye, I., M. L. Jones, J. R. Bence, T. O. Brenden, C. P. Madenjian, and D. M. Warner. 2014. A multispecies statistical age-structured model to assess predator–prey balance: application to an intensively managed Lake Michigan pelagic fish community. Canadian Journal of Fisheries and Aquatic Sciences 71:1-18.

Total Lake-wide Biomass of Chinook Salmon Ages ≥1 (1967-2017)

Biomass (kg)

16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0

1967 1972 1977 1982 1987 1992 1997 2002 2007 2012 2017

2017

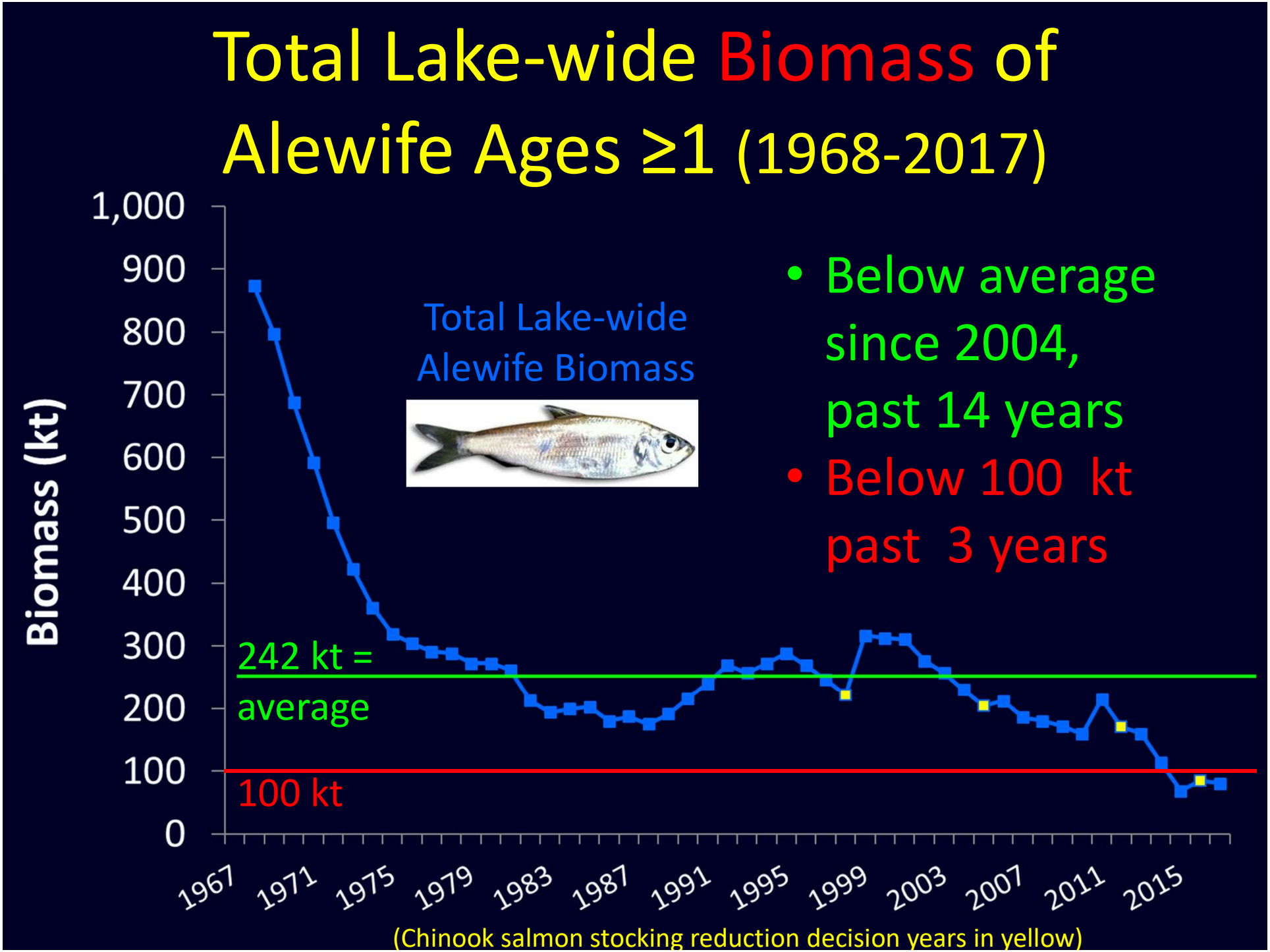
2015 = 3.5 kt

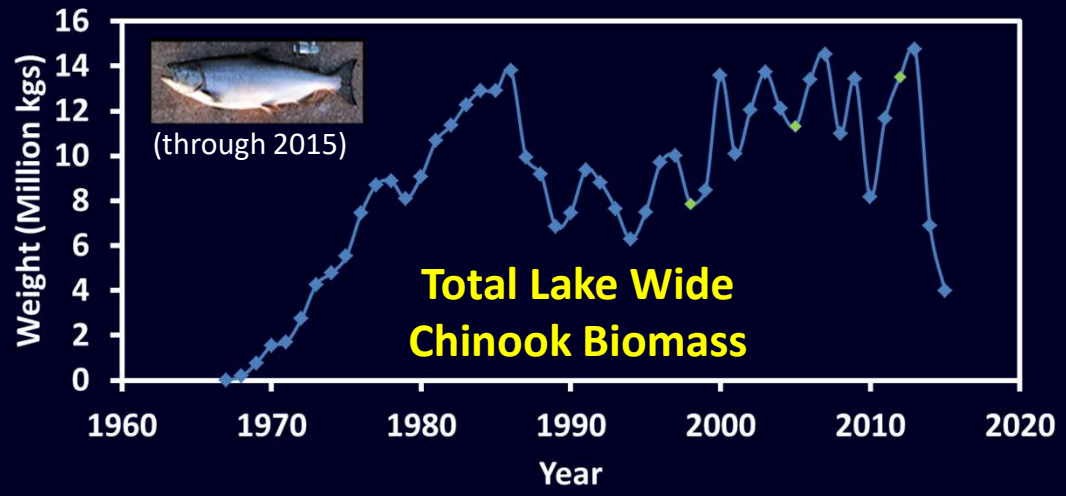
2017 = 4.7 kt

Lowest since 1970's

(Chinook salmon stocking reduction decision years in yellow)

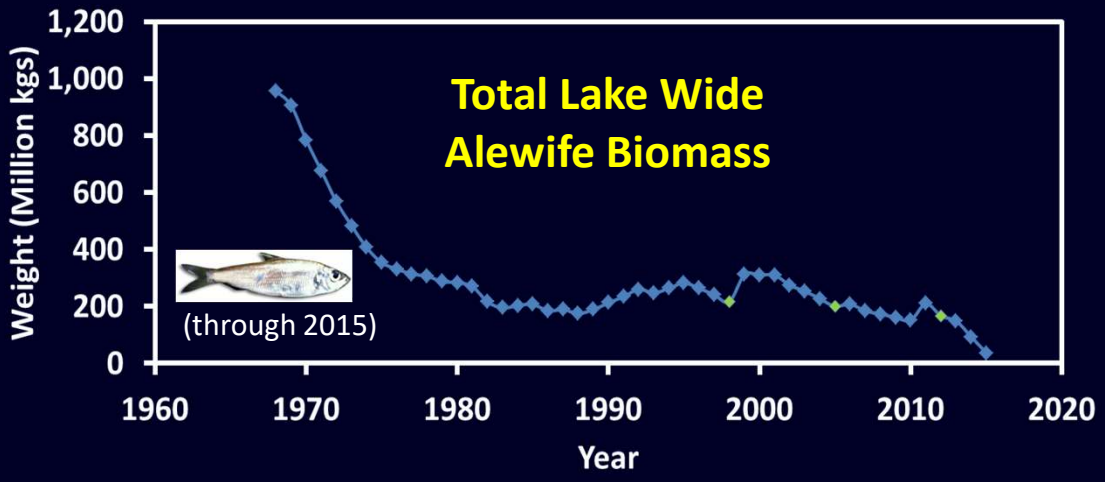
Total Lake-wide Biomass of Alewife Ages ≥1 (1968-2017)



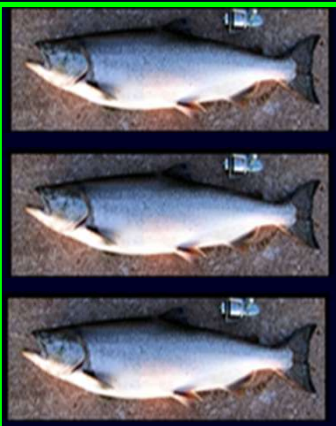

16
14
12
10
8
6
4
2
0
Weight (Million kgs)
(through 2015)
Total Lake Wide
Chinook Biomass
1960
1970
1980
1990
2000
2010
2020
Year

÷

= PPR


1,200
1,000
800
600
400
200
0
Weight (Million kgs)
Total Lake Wide
Alewife Biomass
(through 2015)
1960
1970
1980
1990
2000
2010
2020
Year

A simple but important point about the PPR…



14,744,683 kg
Chinook salmon
(like in 2013)

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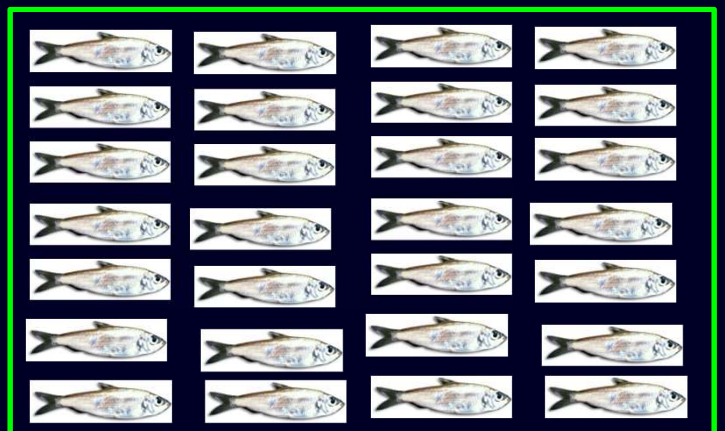

294,893,662 kg
Alewife
(hypothetical)

= 0.05

3,980,384 kg
Chinook salmon
(like in 2015)

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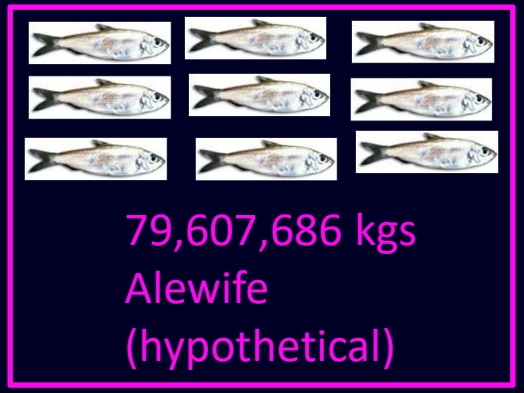

79,607,686 kgs
Alewife
(hypothetical)

= 0.05